ORIGINAL RESEARCH

Exploring the reasons for incomplete child immunisation in selected health facilities in Lusaka: Perspectives from mothers and community health workers

Eddie Kashinka; Chama Mulubwa; Tulani Francis L. Matenga; Oliver Mweemba

Abstract

Background: Immunization is one of the most successful public health initiatives. The World Health Organization in 2017 estimated that immunization averts about 2 to 3 million deaths every year. About 29,000 children worldwide under the age of five die every day, mainly from vaccine-preventable diseases. Uptake of vaccines with multiple doses up to the last dose has been a problem. Incomplete immunization against diseases leads to the reappearance of childhood vaccine-preventable diseases (VPD) and consequently high infant mortality. The paper explored the reasons for incomplete of child immunization schedule in Lusaka district, Zambia. **Methods**: The study employed a concurrent mixed method design where both quantitative and qualitative methods were used. This particular paper focuses on the results from the qualitative component where Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) were conducted with mothers and community health workers. Thematic analysis was used to analyse the data. **Results**: The study found that mothers were generally aware of vaccines and knew the benefits of the vaccines. The reasons for incomplete child immunisation include the mothers' negative perceptions such as the fear of side effects of the vaccines, mothers' unwillingness to bring the child for immunisation. Bad treatment of mothers by health workers and various social factors such as the mother having to attend to social engagements like funerals and weddings also contributed to incomplete child immunisation. Economic factors included a lack of transport money and mothers having to attend work are additional reasons for incomplete child immunization. **Conclusion**: The reasons for incomplete child immunisation revealed by this study reflect complex individual, interpersonal, health systems, and social cultural contexts within which mothers live in their daily lives. There is need for more comprehensive and multi sectoral approach to improve the completion of immunisation schedules in children ***Key words:*** Child immunization, incomplete immunisation, mothers, vaccines

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Introduction

Children under the age of five die every day, mainly from vaccine-preventable causes (Tadesse et al., 2009a). The most common vaccine-preventable diseases tracked by the World Health Organization (WHO) are diphtheria, Haemophilus influenza, hepatitis B, measles, meningitis, mumps, pertussis, poliomyelitis, rubella, tetanus, tuberculosis, and yellow fever. Immunisation is one of the most successful public health initiatives to prevent diseases and reduce mortality in children (Shukla and Shah, 2018). The World Health Organization in 2017 estimated that immunization currently averts an estimated 2 to 3 million deaths every year. Some studies show that scaling up the use of existing vaccines in 72 of the world's poorest countries could save 6.4 million lives and avert $6.2 billion in treatment costs and $145 billion in productivity losses between 2011 and 2020 (Ozawa et al., 2011). Even though child immunization against disease has shown to be cost-effective worldwide through which several serious childhood diseases have successfully been prevented or eradicated, partial or incomplete immunization against vaccine-preventable diseases has remained a challenge (Wemakor et al., 2018).

Partial or incomplete immunization is any child who does not receive all 8 vaccine doses as defined by WHO/UNICEF guidelines (one dose of BCG, 3 doses of pentavalent, 3 doses of polio and one dose of measles within the first year of life) before 12 months of age. Incomplete immunization leads to reappearance of childhood vaccine preventable diseases (VPD), which are responsible for a significant portion of childhood morbidity and mortality in low-income countries and have been re-emerging in medium and high-income countries (Glatman-Freedman and Nichols, 2012). In Zambia, VPD such as pneumonia, and diarrhoea are among leading contributors to high under-5 mortality rates. The Zambia Demographic Health Survey (2013-14) highlights a drop-in coverage of the DPT (diphtheria, pertussis, and tetanus) and polio vaccines with respective dropout rates of 11% and 19% between the first and third doses. Only 58% of children had received all of the basic vaccinations at 12 months (Office, 2015).

Some factors associated with incomplete immunisation include, lack of knowledge and awareness about vaccine schedules and lack of understanding of the benefits of full immunization, lack of education, and negative perceptions such as fear of side effects (Tadesse et al., 2009b, Russo et al., 2015, Tickner et al., 2006, Ismail et al., 2014, Adedokun et al., 2017). Other factors include socio-economic factors including lack of transport money to the facility and busy working schedule for mothers (Shrestha et al., 2016, Favin et al., 2012, Ismail et al., 2014). Birth order where being second to fourth in the family and being fifth and above in the family had a higher likelihood to default than being born first (Negussie et al., 2016). Additionally, safety concerns are another reason for incomplete vaccine immunisation, in a survey by (Ventola (Ventola, 2016) of 13,000 parents, the most commonly cited hindrance to vaccination were concerns regarding side effects.

Apart from some quantitative studies, few studies have been conducted to explain and provide an in-depth understanding on the reasons for non-incompletion of child immunisation in multiple facilities. This study reports results that emerged from a qualitative component of a mixed method study on factors associated with incompletion of child immunisation schedule in selected health facilities in Lusaka, Zambia.

Methodology

Study Design

The study was part of an explanatory mixed method study where both quantitative and qualitative methods were used to have an in-depth understanding of the factors associated with incomplete Immunisation. The quantitative component was based on secondary data obtained from the GAVI funded Full Country Evaluation (GAVI FCE), Household Survey conducted in 2014/15 by the Department of Economics at the University of Zambia. The primary objective of the Household survey was to establish baseline household estimates of immunization coverage in Zambia. Based on the analysis of the quantitative data, a qualitative component was employed to explain and understand in depth some of the reasons for incomplete child immunisation in selected health facilities which recorded more cases of incomplete immunisation.

Study site

The study was conducted in Kamwala, Mandevu, Mtendere, Matero, and Kanyama clinics. All these health facilities are located in high density

areas of Lusaka and receive high volume of clients per day including the under-five clinics. These clinics were among those which had their catchment areas participate in the Gavi FCE household survey. These clinics were purposely selected because they a significant number of cases of incomplete immunisations recorded in the household survey as well as clinical records.

Study population

The study population were mothers with children aged 12-59 months who were recruited to participate in Focus Groups Discussions. These mothers were selected because at 12-59 months a child is expected to have received all the vaccines on the schedule. These mothers were identified and recruited through community health workers because they had missed one or more immunisation appointments based on their child's under-five cards. The community health workers, because of their nature of work, were also recruited for key informant interviews.

Data Collection

Focus group discussions (FGD) were conducted in Bemba, Nyanja and English by the first author using an FDG topic guide and KII topic guide respectively. A total of 5 FDGs (one in each facility) were conducted with a total of 35 women at in a private room at the health facility. The FGDs lasted between 30 to 100 minutes. Each FGD was recorded using a digital voice recorder and notes were taken by a trained note taker. The FGDs included topics on general knowledge on immunization, attitudes and beliefs on immunization and their experiences and practices relating to seeking immunisation services including the reasons for non-completion of immunisation schedule.

A total of 5 key informant interviews were also conducted with the community health workers in a private room within the health facility using a topic guide developed based on the issues emerging in the FGDs, and the literature. The community health workers were purposively selected because of their involvement in immunisation activities at the health facility and their knowledge of the communities within the catchment areas where the GAVI FCE was conducted. Each interview lasted between 20 to 60 minutes and was recorded using a digital voice recorder. The key informant interviews explored reasons for incomplete immunization in their facilities and the community at large.

Data management and analysis

The FGDs and KIIs were audio recorded and transcribed immediately after fieldwork and personal identifiers removed. The date was analysed using a thematic method. The authors read through the transcriptions several times to familiarized themselves with the data and identify the emerging themes. All authors independently identified themes from the text, compared and agreed on the final themes to be used in coding the data as well as how to categorise the data. The data was then coded using NVivo 11. Further analysis included categorising and analysing patterns and associations within and across cases.

Ethical issues

Table 2
Shows the sub themes that are discussed under each main theme.

Major Themes	**Subthemes**
Mother's perceptions, beliefs and behaviour	*Mothers belief that prayer protects than vaccines*
	Mother's belief that vaccines are unsafe
	Mothers' perception of health workers
	Mother's laziness and negligence
	Alcohol abuse among mothers
Experiences with immunisation services	*Child's adverse reaction to the vaccine*
	Health worker attitude towards mothers
	Long waiting time to get immunised
Other reasons	*Number of Children*
	Child's health
	Competing priorities

The study protocol was approved by UNZABREC. Permission to visit health facilities was granted by the Ministry of Health, through the Nation Health Research Authority. At facility level permission was granted by the in charge of these health facilities. Mothers and community health worker consented to participate in the study.

Results

This study set out to understand the reasons for non-completion of immunisation. The main themes from our study include mothers' perceptions, beliefs and behaviour, experience with immunisation services, and other reasons such as number of children, and competing priorities for mothers.

Mother's perceptions, beliefs and behaviour

This theme includes a number of sub themes. These include mother's beliefs that prayers protect than vaccines, mother's belief that vaccines are unsafe, mothers' perception of health workers, mother's laziness and negligence, and alcohol abuse among mothers.

Mothers belief that prayer protects than vaccines

Respondents reported that prayer was more important than vaccines; immunisation was not to bring protection on a child but prayers. A community health worker reported how people in the community replaced vaccination with prayers:

> *Some do not believe in vaccines; they depend solely on prayer because this is what they are taught at church, their churches refuse them to do that. They tell them that they (preachers) have had children and none of them has received vaccines, but they are still ok and healthy. They say for us we don't get vaccines even when a child is born no matter what.* (Community health worker)

Mothers from the FDGs also indicated that a child would get well and be protected from any harm through prayers.

> *They start first by praying for the child by the pastor and they believe that a child should grow without these vaccines or any medication* (Mother of 6, 36 years old)

Mother's belief that vaccines are unsafe

Despite existing scientific evidence indicating that vaccines are safe and effective, many mothers still remain sceptical. The interviews and FDGs revealed some mistrust regarding vaccines that communities have. One mother stated that:

> *Some [mothers] say that the vaccine that is given on the leg, may cause children to have problems with their legs, some [children] develop swollen feet and other problems. Mothers say these vaccines increase the body temperature of the child* (Mother of 5, 40 years old)

In additional, mothers were of the view that they survived in olden days when there were no vaccines. They argued that they grew up healthy without the vaccines. One mother in an FGD said:

> *For me on the issue of vaccines, I would say others take advantage to say that what about in the olden days, how did they used to live? That why others don't pay attention in bringing their children or even completing the vaccines. People in the olden days would not have their child vaccinated but still the baby would grow* (*Mother of 5, 40 years old*)

Mothers' perception of health workers

Some mothers have some superstitions about vaccines and health workers attending to them at the facility. Some mothers discontinued immunisation because they suspected that the nurse attending to them is involved in some satanic rituals. A mother narrated in an FGD what she heard in the community:

> *When a child gets sick [develops high body temperatures] after the child has been vaccinated. Others [mothers] attribute that to Satanism, they say the one injecting [nurse] has got 'very bad hand' and was a Satanist and I will not return there as a result they will not complete. This is bad when a fellow mother loses a child* (Mother of 2, 35 years old)

Mother's laziness and negligence

Mother's laziness and negligence came up in most participants in interviews and focus group discussions. A mother participating in an FGD stated:

> *It's just laziness of other mothers. I hear others say that it is not important* (Mother of 6, 36 years old)

A community health worker also added that mothers are actually aware about these vaccines and that their children should be immunised. In addition, mothers have been followed up to their home to just get their children immunised. Community health workers indicated that there are a lot of efforts to have every child immunised including outreach services within the communities. Despite all this, some mothers were reported to be lazy to have their child complete immunisation:

> *Mothers are Lazy because they are given full education at ANC [Antenatal clinics] and they know the benefits. We also follow them at their homes and even in the marketplaces, so they have no excuses. They chose the outreach points themselves* (*Community health worker)*

Alcohol abuse among mothers

Alcohol abuse among some mothers was cited by the mothers and health workers as contributing to incomplete immunisation. Younger mothers were reported to spend time in drinking place and taking alcohol; ending up too drunk to bring their child for immunisation. A community health worker argued:

> *For younger mothers, mostly the problem is beer drinking because some mothers start drinking beer very early in the morning, they don't even have the time to bring their children for immunisation. Sometimes mothers can start [immunisation] well but just stop along the way, they don't even go up to nine months because of the drinking* (Community health worker)

Mothers echoed a similar sentiment that some fellow mothers drunk alcohol at the expense of bringing the child for immunisation.

> *Other mothers like to go in bars to drink alcohol and so they don't have time to bring their child, early in the morning they start to drink and what time do they bring their child for immunisation* (Mother of 4, 25 years old)

Experiences with immunisation services

A number of reasons are discussed under this theme. These include Child adverse reaction to vaccine, health worker's attitudes, and long waiting time to get immunised.

Child's adverse reaction to the vaccine

Mothers reported some perceived side effects of vaccines that have led to incomplete child immunisation. Mothers had stated that in certain instances mothers would not come back to complete immunisation schedule because they think their child would become sick or endure severe pain. Some children are reported crying the whole night and mothers would have to stay up all night to nurse the child.

> *Another reason that causes mothers not to continue with vaccines is when the child gets an injection and gets ill, so some mothers decide to hold back stating that I cannot stay up all night even today because the child got ill last time and so I won't take them for the next doses* (*Mother of 2, 23 years old*)

A community health worker also indicated a similar point that some side effected led some mothers not to continue with immunisation.

> *When the child's body temperature increases the mother would say that nurse has 'bad hands' and that discourages them to come for the other doses* (*Community health worker*)

Health worker attitude towards mothers

Health worker's attitude was reported to contribute to incomplete immunisation. Negative attitude from health workers has resulted in drop out of immunisation especially by mother who perceived themselves to be short tempered and cannot stand the harsh treatment from health workers. Scolding and shouting at the mothers was reported as another reason for incomplete child immunisation.

> *The reception they [mothers] receive will determine whether or not they will come back. For instance, when someone comes to the clinic and instead of welcoming them you shout at them and don't give them the respect they deserve. Some of these people have got offices [work]as well. In as much as they came here as our client, they have a life beyond just receiving vaccines. If those women are not properly handled probably, they may be discouraged to come for the subsequent doses* (Community health worker)

Mothers also reported to have experienced bad treatment. They reported that nurses were sometime harsh, and this discourages some mothers to continue immunisation.

Nurses get annoyed and shout at us, especially for those that are not consistent with bringing their children here. Others who are short tempered just quit immunisation (*Mother of 4, 33 years old*)

Some mothers reported having been sent away by health workers for various reasons including coming outside immunisation appointment date, or because of having enough numbers, hence avoid vaccine wastage. Some mothers that were sent back home in such circumstances were reported never to come back to complete child immunisation.

In most cases nurse will shout if a mother doesn't bring the child on the date that they are supposed to and in most cases the mother is sent back and assigned another date. They would say that you have done that on purpose. They chase you away so that next time you should be much more serious when you come and bring the child on that specific day you are given (Mother of 4, 30years old)

Long waiting time to get immunised

Time spent at the facility was also identified as a reason for immunisation dropouts. Mothers reported that they spent a lot of time waiting for their children to be vaccinated because they were too many to be attended to.

Time spent on the queue can contribute to dropout as some mothers decide to give up. Some mothers decide to stay away because too much time is spent waiting. Others who can afford decide to take their children to private clinics because less time is spent waiting. (Mother of 4, 31 years old)

Related to time is vaccine stock. Some mothers indicated that the vaccine run out while waiting for a long time on the queue which discouraged them to come back later to complete the immunisation schedule.

Sometimes medicines [vaccines] finishes while I am on the queue, when this happens, I am told to return the next day but I already have a program for the next day and so I feel lazy to continue, I just let it be (Mother of 3, 23 *years old*).

Other reasons

There were also other reasons that emerged in this study on why mothers never completed the immunisation schedule. These include number of children, child health, and competing programs for mothers.

Number of Children

Participants from focus group discussions and interviews, reported that mothers with a bigger number of children were generally reluctance to have their children immunised especially when the older children were looking healthy even after she had missed a vaccine.

Sometimes when a mother has many children, the younger ones are not taken for immunisation because they look at the older children who they have and have not finished their immunisation schedule and are just fine, I have witnessed this myself on a mother who had four children. She just stopped like that (Community health worker).

Child's health

Even first-time mothers were reported to discontinue immunisation based on the health of the child. Mothers of healthy-looking children who are active and generally free from many forms of sickness never saw the point of taking or of continuing with immunisation.

When the child seems to be looking healthy and fine, the mothers become reluctant to complete the child's vaccination. Mothers are difficult, when they see their child just walking and playing fine, they say that the child is just fine and forget about immunisation. [but] when child is not well mothers do continue with the immunisation [because they have to go to the clinic] (Mother of 4, 31 years old)

Competing priorities

Mothers are generally involved in many other socio-economic activities including formal employment or being engaged in small businesses such as selling at the market. Such competing priorities were reported to contribute to mothers not completing their children's' immunisation schedule.

Some mothers are busy doing business and that's why they don't continue bringing their children. They feel their business will slow down if they bring their children for under-five clinics (*Mother of 6, 36 years old*)

A community health worker added that attending funerals especially out of town are sometimes a cause for incomplete child immunisation.

> *There are also other things that can affect the completion of the immunisation schedule, sometimes they would tell you I went for a funeral and that's the reason I missed this one (Community health worker)*

Some mothers indicated that sometimes they have to attend to church programs, making them miss an immunisation appointment. A mother during a focus group discussion said:

> *We do sometimes have to decide [and] say I cannot forget my God because of these injections [vaccines], God will help my child and I go to church and forget* (Mother of 3, 28 years old)

Discussion

This study explored the reasons for incomplete immunisation schedule from mothers and health workers. The study found that mothers' perceptions, beliefs and behaviours affected the completion of the immunisation schedule. These include mothers' belief that prayer would protect the child better than a vaccine, mother's belief that vaccines are unsafe, mothers' perception of health workers, laziness and negligence among mothers, and alcohol abuse among mothers. Some of the reasons have reported by other studies. For example, Tauil et al., (2016) reported that immunisation has been negatively affected by beliefs that vaccination is not beneficial but rather causes damage to the child. Other studies have reported that there was generally a lack of confidence in the safety and effectiveness of vaccines (Gilbert et al., 2017) for example in a study conducted in Gondar city administration, Northwest Ethiopia Yismaw and colleagues (2019) revealed that participants who have lack of knowledge about vaccination were 6 times higher incomplete vaccination than those who have good knowledge. As such, mothers have been reported to drop out from using vaccines and replace them with traditional medicine, especially when a child presents some side effects after receiving immunisation (Gilbert et al., 2017). Beyond the results from this study, a study by Adedokun et al. (2017) also highlighted the importance of education were found that children of mothers with no education and primary education are more likely to have their children incompletely immunized compared with children of women with secondary or higher education.

This suggests that knowledge and other cognitive factors play a role to get mothers to participate and complete the immunisation schedule. However, as shown in this study and others, there seem to be an information gap between the health worker and the mothers on the effectiveness of the vaccines and some potential side effects after taking the vaccines (Tadesse et al., 2009; Russo et al., 2015). In a study conducted in North State, Sudan by Ali et al, (2020) found that few mothers argued that vaccines are not important because their parents were not vaccinated and they are quiet well and so there was no need for them to get their children vaccinated. This finding and our study finding support the need for health workers to be able to provide more information about the vaccines including the potential side effects that may follow after immunisation and how to handle the sides effects because several studies have found that parents commonly mentioned fear of side effects and wrong ideas about contraindications as a reason for not continuing vaccinating their children (Tibin et al., 2014; Favin et al., 2012(Yismaw et al., 2019)).

This study also found that some of the reasons for incomplete immunisation had to do with women's experiences with immunisation services. These include children adverse reaction to the vaccines, health workers attitudes towards the mothers, and long waiting times to immunised. Some studies have reported similar findings especially the health worker's negative attitudes such that some mothers felt humiliated and discouraged from returning for further doses (Favin et al., 2012, Favin et al. 2012, AlConde, 2002). Similarly, Tadesse (2009) also reported how long waiting times before being attended to at the health facility has been cited as factors leading to immunisation dropouts. Most of the issues that arise regarding the experiences with immunisation services suggest the need to strengthening the health system to support the delivery of quality and efficient services to their clients. The services may be strengthened by considering the use of mobile services to the communities to avoid long distances and long waiting times. It is therefore important that communication by health care workers is effective. Similarly a study by Oku and

Colleagues (2017) found that a few caregivers described the impolite behavior of health workers towards women with low levels of education, teenage mothers and mothers who arrived late or forgot their vaccination cards.

Lastly, result from a study conducted in South Asian countries, India, Bangladesh and Nepal by S Mik (2018) revealed that factors such as mother's age, residence, birth order and religion had minimal impact on complete immunization coverage in India, our study found other factors such as number of children, child's health and competing priorities as some of the reasons for incomplete immunisation schedule. Related to number of children and their health, a study by Negussie et al., (2016), reported that second to fourth in the family and being fifth and above in the family had a higher likelihood to default than being born first. Some mothers were reported to be reluctant or even stop immunisation even with as soon as the child grows and is looking healthy.

On competing priorities, our study, mothers and community health works reported that sometimes mothers have had to decide between attending to their businesses and bringing the child for immunisation. Sometimes they have situations where they are engaged in periodic jobs called 'piece work' and it becomes very difficult to turn down the offer because these are usually once off work. Some mothers reported that they have had to travel for family gatherings such as funerals, wedding and events and sometimes they carry the child with them. This is similar to what has been reported in other studies. Tibin et al. (2014) found that the reasons for non-immunization and incomplete immunization included, mother being too busy, family problem including illness of mother and other conflicting priorities such as taking care of sick or other children and taking care of other older children. Favin et al. (2012) also reported similar findings on competing priorities that some parents needed to travel long distances and then wait for hours for vaccination, when they should be working to feed the family that day. In addition, ceremonial event like weddings and funerals in some countries last up to a week and lead mothers to miss vaccination appointments. Similarly, Shrestha and colleagues (2016) in their study reported conflicting priorities like the need to take care of sick or other children, caretakers' own illness, weddings, and funerals as well as cultural feast/ festivals might be the major obstacles to completing child vaccination schedules.

The issues that emerged above require continuous education of the potential clients on the importance of completing the immunisation schedule despite the child looking health. There is also a need to address the competing priorities by providing incentives for any completed schedule per child. Considerations to take mobile services to the communities and sites where women participant in economic activities would also help women access the services without much disruption of their economic and daily activities.

Limitations of the study

One limitation of the study was the inability to achieve a representative sample of participants as the study was conducted with a small sample of respondents therefore results may not be generalised beyond the study population. The study is not exhaustive of the various factors that impact on mother's ability to complete the immunisation schedule. It is our belief there are many other individual, interpersonal, and enabling factors in different contexts that work in a complex way to prevent women from completing the immunisation schedule. It is our hope, however, that the findings from this study may be used as a learning resource to effectively implement activities that are responsive to different factors affecting expanded immunisation programs.

Conclusion

This study has established that the lack of basic knowledge of immunisation and the lack of awareness about the immunisation schedules, and general the benefits of immunisation was found to be reason for incomplete child immunisation. The lack of formal education contributes negatively to immunisation uptake. Other factors such as perceived side effects coupled with fear of the vaccines has discouraged some mothers not to continue immunisation. Beliefs of immunisation were mostly religious and cultural. Religiously, mothers have been discouraged to continue immunisation by their religious leaders. This has equally impacted on immunisation dropout among mothers. Further, mother's unwillingness and laziness have been found to contribute to immunisation dropout. This

is mainly based on the premise that mothers are well aware about the vaccine and its benefits. Lifestyles, such as alcohol drinking has also been identified as a factor contribution to low uptake of immunisation. The bad treatment mothers received from the health workers contributes to incomplete immunisation. Bad treatment included scolding, shouting and screaming at a mother for various reasons. Further, waiting time for immunisation was indicated as a factor that discouraged mothers to continue child immunisation. Furthermore, mothers do not come for immunisation because they have other social engagements to attend to such as funerals and weddings. Further, mothers reported that they had economic engagements or opportunities which lead them to miss immunisation, these include part time work, or their daily businesses at the market selling stuff such as vegetable, fruits, or even groceries. Others economic reasons include the lack of transport money to get to the facility.

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